We need to ask right questions on climate change; Planet will continue to heat up, writes Simon Donne

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Extreme heat, fires and smoke across Canada and elsewhere in the northern hemisphere this summer have killed people, driven others out of homes, and hurt businesses.

The human suffering is a stark reminder that climate change is about so much more than the environment. Climate change is about us. It is about our legacy. We are seeing the legacy of past greenhouse gas emissions in this summer's heat and human suffering.

Yet when you ask a climate scientist the popular question - "Is this heat wave (or drought, or fire, or flood) caused by climate change?" - you often get some variation of the same evasive-sounding answer: "It is not possible to attribute a single heat wave to climate change, but heat waves like this are what we expect to happen more often on a warmer planet."

The main problem is the question. Doctors know with high certainty that cigarette smoking causes cancer, just as climate scientists know with high certainty that greenhouse gas emissions cause global warming. Yet you would not ask your doctor "Will smoking cause me to develop cancer in the lower lobe of my left lung on Aug. 28, 2023?" The question asks for an unrealistically precise diagnosis given the complexity of the system and the multitude of possible factors at play.

The other problem is the culture of science. Scientists are trained to be precise and to respect the limits of knowledge. When faced with an unanswerable question, we state what science cannot do, rather than rephrase the question and state what science can do.

For years, such unintentional equivocation by climate scientists has been intentionally used by climate denialists and opponents of climate policy to seed public doubt about the link between climate change and extreme events.

In truth, climate science can say a lot about the role of climate change in extreme events.

One approach is to examine the basic physical principles. For example, a warmer planet on average means a shift in the distribution of weather, such that extreme heat should become more common than extreme cold. More summer heat also dries out soils, leading to more severe droughts. Faster warming in the Arctic than in the tropics, again expected from physical principles, slows down the jet stream, which causes weather systems to stay in place for longer. Put that all together, and you get summers like 2018.

Another approach actually borrows from medical science. We can use our knowledge of the system (the climate or the human body) to ask how much certain behaviour (climate change or smoking) will change the odds of a certain event occurring (heat wave or cancer).

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For example, a decade ago, my colleagues and I conducted a study of a Caribbean heat wave that was responsible for killing corals and spawning tropical cyclones. We found that the heat wave was at least 10 times more likely to happen due to human-induced climate change.

Thanks to advances in climate modelling, analytical techniques, and computing power, research that took us many months can now be done in a few days. The World Weather Attribution initiative is now conducting rapid assessments of extreme events. They recently found that July's heat wave in Europe was by two to five times more likely to happen because of climate change.

This type of climate change "attribution" research is not currently feasible for all types of extreme events. For example, attribution of individual forest fires or the smoke blanketing British Columbia is complicated by changes in land use and fire suppression over time, as well as the process by which the fires are started. Nonetheless, one study found that climate change has increased the risk of extreme fires in Western Canada by up to six times.

The science clearly shows that climate change is happening now.

The summer of 2018, though, is not a new normal. As long as we keep adding greenhouse gases to the atmosphere, the planet will continue to warm. Future summers will be even hotter than that of 2018. If we want to be prepared, we need to ask the right questions. Simon Donner is a professor in the department of geography and the Institute for the Oceans and Fisheries at the University of B.C. !@COPYRIGHT=© 2018 Postmedia Network Inc. All rights reserved.

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